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THE VERMONT WAY FORWARD: A GLOBAL CENTER FOR ENVIRONMENTAL ENGINEERING

> *"We will weave into our economy companies that share our sensible approach to protecting the environment. We will cultivate innovators in environmental engineering and become the world center for the solutions of tomorrow."*
>
> Governor Jim Douglas, Inaugural Address, Thursday, January 4, 2007

EXECUTIVE SUMMARY

25 years ago, Vermont recognized the benefits of making Vermont attractive as a captive insurance domicile and established an industry whose economic contributions to the state are matched only by its worldwide reputation for quality. Now Governor Douglas has set Vermont on a new course to also become a world leader in the field of environmental engineering, study and practice.

Vermont will concentrate existing resources and invest in new infrastructure to establish the state as a global center for the study and application of environmental engineering, and related disciplines, necessary to solve environmental problems worldwide.

Environmental engineering at the academic and applied level will leverage the innovation, knowledge and creativity of Vermonters and Vermont-based organizations to look beyond our borders to solve the extreme environmental challenges that exist today and into the future.

Vermont will leverage its considerable assets related to the field of environmental engineering to create a value proposition for entrepreneurs and professional firms to build their environmental and related practices and businesses here in Vermont. These firms will employ an ample stream of graduates from Vermont's and other states' engineering schools in high paying jobs with excellent benefits.

VERMONT'S ECONOMIC DEVELOPMENT PLAN

Vermont's Economic Development Strategy and Plan is comprised of a number of key principals that include:

- Our core objective is to "grow the pie:" To make the economy larger to benefit all Vermonters in a more significant way.
- Vermont's economic development effort is like a three-legged stool based on retention and growth of existing businesses; support of entrepreneurs in start-up and emerging businesses; and recruitment of new businesses.
- We will deploy the majority of our resources in aggressive retention activities supporting our best customers: Vermont's existing businesses.
- We will continue to support Vermont's value-added manufacturing industries.
- We will continue to support Vermont's legacy industries in agriculture and natural products.
- We recognize the critical role that education and health care play in our economy and we will work with agencies at the state and local level to support these sectors.
- We will continue to support the Vermont tourism industry to include associated businesses devoted to the arts, crafts, cultural heritage and historic preservation.
- We will seek to maintain a broad diversity of businesses and industries both by sector and size.
- When we deploy resources to recruit new businesses we will concentrate on targets of opportunity that meet our "sweet spot"
    1. Businesses with 20 to 200 employees;
    2. Businesses that do not generally have high workers compensation exposure or power demands (unless costs become more competitive);
    3. Businesses that have a nominal environmental footprint;
    4. Businesses that build on an existing industry cluster.

Identifying and leveraging key existing industry clusters is an important element in our strategy to grow the Vermont economy. Vermont benefits from a concentration of businesses in agriculture, tourism, electronics, health care, software development and high technology manufacturing.

In an effort to promote diversity and build on the principals outlined above, we must continue to assess our capacity to support key industry clusters in much the same way Vermont identified captive insurance as a business opportunity a quarter century ago.

This initiative is perfectly consistent with our existing economic development strategy and plan and also with Vermont's environmental ethic, which has deep roots in our culture and in our "brand."

WHAT IS ENVIRONMENTAL ENGINEERING?

Environmental engineering is an established discipline dating back to the mid-1800's that has its foundation in civil, chemical, and mechanical engineering as well as supporting

disciplines to include mathematics, the sciences, public health, environmental law and the humanities.

Environmental engineers work to identify and implement solutions to problems associated with ground and surface water contamination, air pollution, hazardous waste, toxic materials, contaminated sites, water supply, public health and safety, wastewater management, storm-water management and a variety of other challenges.

WHY IS ENVIRONMENTAL ENGINEERING A GROWING INDUSTRY?

In the last 30 years, industrialized nations have begun to identify environmental problems within and outside of their borders and in many cases have initiated cleanup programs. They are also, in many cases, installing new, complex processes and technologies to curb future environmental degradation.

Industrialized countries have had mixed success in this endeavor but are making some progress toward identifying problems, remediating impacts and avoiding additional degradation. Of course, opinions vary widely as to how successful nations and governments are in controlling environmental impacts.

Emerging industrial nations have frequently concentrated on improving the economic condition of their population without appropriately considering the effects on the environment. Many of these countries, such as China, are just now recognizing the impacts of uncontrolled growth and are beginning to seek strategies to address prior and future impacts on the environment.

Many other nations of the world, while not industrialized to the same extent, still face environmental challenges due to mining activities or the removal of other natural resources. These countries will ultimately need to take steps to remediate the impacts of prior decisions.

While the development of public policy and law has played a critical role in helping countries to recognize and address their environmental challenges it has been the work of the engineer to adapt scientific discovery to real world problems and put in place mechanisms to remediate environmental impacts. In each of these cases – public policy, law and, now engineering – Vermont will be recognized as a place where environmental solutions are found.

WHY VERMONT?

Vermont has the fundamental building blocks upon which our environmental engineering industry cluster can grow and become a global leader in environmental solutions. Governor Douglas recognizes that Vermont has the opportunity to project its environmental ethic, culture, knowledge and expertise into a problem-solving platform that can serve to address the great environmental challenges of the next century.

In recent years leaders such as Governor Jim Douglas, Lt. Governor Brian Dubie, University of Vermont President Daniel Fogel and others have talked about the “Green

Valley." Essentially the Green Valley is an economic development strategy that leverages Vermont's environmental products and services industry; the environmental stewardship component of Vermont's brand; and a culture of support for environmental initiatives to build a "green" economy.

The central purpose of this green economy is to support an industry that features high paying jobs while exporting our expertise to solve environmental problems worldwide.

With the emergence of environmental engineering as a core industry sector we can more clearly and completely define the "Green Valley" of Vermont as the place where the world's environmental issues are addressed.

Developing and implementing plans to utilize technology found either here in Vermont or elsewhere to remediate an environmental impact is the job of an environmental engineer. The environmental engineer is, in many ways, the central figure in addressing identified environmental challenges by utilizing scientific and engineering principals to solve the problem. Problem solving is an inherently creative task that applies knowledge and experience to achieve an end. This is the role that Vermont engineering firms will play.

Critical to the ability of the state to help existing engineering firms grow, as well as our ability to attract new firms to the state, is the availability of educated and talented professionals. Institutions of higher learning in New England and the immediately neighboring regions of contiguous states graduate approximately 6,000 engineers each year. In and around Vermont the following schools have relevant engineering programs:

- University of Vermont – Undergraduate programs in Environmental Engineering and graduate programs in Civil and Environmental Engineering; undergraduate and graduate degrees in Environmental Sciences and Environmental Studies.

- Norwich University – Undergraduate degrees in Civil and Environmental Engineering and graduate degrees in Civil Engineering and Mechanical Engineering.

- Vermont Technical College – Associates degree in Civil and Environmental Engineering.

- Dartmouth College (Thayer School of Engineering) - Undergraduate and graduate degrees in engineering and fields of study related to environmental engineering

- Massachusetts Institute of Technology – A full range of engineering disciplines including Civil and Environmental Engineering - ranked America's Best Engineering School by US News and World Report.

- Rensselaer Polytechnic Institute (RPI) – Undergraduate and graduate degrees in Civil, Chemical, Mechanical and Environmental Engineering.

Proximity, both physical and virtual, is also an important asset in Vermont's ability to grow the Environmental Engineering cluster. Governor Douglas' aggressive pursuit of broadband infrastructure in all corners of the state allows us to have connectivity to projects worldwide. When it comes to engineering environmental solutions, a remote location is as close to the action as any large city or academic center.

In terms of physical proximity however, Vermont is but a short relative distance to the urban centers of Boston, New York and Washington DC on the domestic side and Montreal, Quebec City and Toronto internationally.

Ability to access job sites is also important as a locational asset. By utilizing airports in Burlington, Hartford, Albany, Boston or Montreal, key personnel are but one stop from virtually any destination worldwide.

People with like interests tend to gravitate toward others with similar interests. This notion holds true for engineers and Vermont already has a very considerable engineering community. Many of Vermont's engineers work for firms such as IBM, General Dynamics, General Electric, BF Goodrich, NSK, Qimonda, Concepts NREC and Northern Power Systems.

Others work for consulting engineering companies such as Stantec and DuBois and King. There is a multitude of smaller firms and operations that employ engineers in Vermont giving the state a strong base of professional expertise upon which to build.

As stated above, on an international level there is a rapidly growing demand for Environmental Engineering solutions. China, India and the former Eastern Bloc-counties are all recognizing the environmental challenges they face and they alone represent an enormous market for environmental products and services including engineering. We will seek to support the viability of Vermont-based engineering firms through their entrance into worldwide markets where engineering firms are solving environmental problems.

One of Vermont's primary areas of interest in our relations with the Peoples Republic of China and the Republic of China is in environmental products and services. We have found through trade missions that the larger environmental firms have established operations in both China and Taiwan.

In recent years we have reached out to these companies to alert them to the environmental product and service providers that are located in Vermont and who might supply the knowledge, materials, products and services to help solve identified problems on site. Many of these firms will lead remediation efforts and will seek out expertise on specialized issues from known service providers.

Furthermore, the state has opened relations with both Peoples Republic of China and Republic of China environmental officials at the national and provincial level who will be

in positions to make decisions about investing resources in the mediation and resolution of extreme environmental challenges in these countries.

There is a close working relationship between the governments of these countries and the engineering firms who will be the critical link in solving existing and emerging environmental problems. Building relationships with the firms on the ground and key governmental officials at the provincial and national level can provide a real advantage for a Vermont-based division or firm wishing to respond to this market.

A critical additional component of this effort is to continue to build on the very significant educational exchanges that have occurred between Vermont and both the Peoples Republic of China and Republic of China. Students from both of these countries have traveled to Vermont to study at the secondary, post-secondary and graduate levels.

Vermont will leverage these relationships to increase the flow of engineering students who will not only achieve a world class mastery of environmental engineering principles but will also build connections with our state and with our local companies that will link back to contracting for solutions in their home countries.

Again, Vermont can serve as a critical link between the problem solvers educated and working here in professional firms and the decision makers in countries seeking to resolve environmental challenges. Vermont will leverage our significant private and public sector investment in building relations in the PRC and RC to promote our engineering firms while assessing opportunities in Eastern Europe.

HOW WILL WE DO IT?

The State will work with our partners in the academic and private sectors to further develop the "value proposition" that defines the environmental engineering image of Vermont and markets that proposition to firms both large and small.

Our effort will be focused on helping existing environmental practices to grow while attracting divisions of larger firms to locate an office in the state. We can also attract smaller firms that specialize in a narrow band of environmental practice and who seek to be located near the larger contractors.

The Agency of Commerce and Community Development will take the lead in marshalling public and private resources to build the engineering cluster. To support the Agency the Governor will create through Executive Order Environmental Engineering Advisory Council , under the umbrella of the Vermont Technology Council that will focus on growing the environmental engineering sector.

The Governor will appoint several members of the Advisory Council and will offer the Legislature the opportunity to make several appointments as well. The Council he will function as an advisory panel to the Governor and the Agency of Commerce, helping to establish the infrastructure needed to support this industry. Another key function will be to support the recruitment efforts of the agency by identifying target engineering firms

from across the world and educating them on the benefits of moving operations to Vermont.

An abundance of continuing educational opportunities will be critical to attracting the environmental practices of leading engineering firms. Such firms wish to ensure that their professionals can maintain and grow their knowledge of cutting edge environmental and engineering concepts through ready access to continuing educational programs.

As noted above, there are a variety of undergraduate, graduate and continuing educational opportunities within a reasonably short drive of most areas of the state. Some of these programs will be found outside Vermont's borders but the opportunity to grow professionally through continued academic study will be very widely available to firms locating here in the State.

Quality educational opportunities in related curricula in the K-12 system will also be critical to attracting firms and professionals to the state while retaining those already here. The State of Vermont must make a commitment to leading the nation, and indeed, the world in math and science education at the K-12 level.

Such a commitment will serve two purposes. First, it will supply the human capital who will continue with post-secondary educations needed to sustain the growth in environmental engineering and technology firms here in Vermont.

Secondly, it will create an environment which engineers from around the world will be comfortable moving into, secure in the knowledge that their children will receive the best education in the fields of study in which they, the parents, are trained and to where they gravitate.

Another critical piece of infrastructure to support environmental engineering practices in Vermont is the availability of high-speed internet access and large quantities of bandwidth. Governor Douglas has set bold, aggressive goals for broadband and wireless access that we must pursue and achieve. Advances in speed and capacity will continue to be important components of Vermont's value proposition to environmental engineering firms.

Also of critical importance to the growth of environmental engineering is addressing Vermont's affordability challenges as identified by Governor Douglas' Affordability Agenda. Existing firms report that it is difficult to attract the best engineering talent to Vermont because of the lack of housing that is affordable, the heavy tax burden, health care costs, and other related costs of living.

Vermont can leverage many aspects of our quality of life to retain and attract engineering professionals to the state but quality of life also includes the cost of living. Failure to address key affordability issues will impede our ability to grow the environmental engineering sector as well as most any other jobs and professions here in Vermont.

There is very broad consensus that in the decades ahead the world will grow more dependent upon the sciences and engineering to solve a vast array of problems including those involving the environment. Vermont is extremely well positioned to stake a claim to a leadership role in providing solutions to tough environmental problems through policy development, science and, importantly, engineering.

The building blocks to grow the environmental engineering cluster are present. What needs to be done is to assemble those blocks into a thoughtful and strategic effort to create the jobs of the century ahead. Jobs that will not only pay good wages and benefits but will have an impact on improving the quality of the environment on a global scale.

Nothing could be more consistent with who Vermonters are as a people than embarking upon this practical Environmental Engineering agenda.

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